



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/597,673	08/13/2008	Moshe Shoham	20763/0205292-US0	4768
7278	7590	03/22/2011		
DARBY & DARBY P.C. P.O. BOX 770 Church Street Station New York, NY 10008-0770			EXAMINER AMIN, BHAVESH V	
			ART UNIT 3664	PAPER NUMBER
			MAIL DATE 03/22/2011	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/597,673

Applicant(s)

SHOHAM, MOSHE

Examiner

BHAVESH V. AMIN

Art Unit

3664

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 8/3/2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4,6,8-10,12,13,15,17-19,21,23,25,26,28,29 and 31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,6,8-10,12,13,15,17-19,21,23,25,26,28,29 and 31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 March 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO 502)
- 4) ☐ Interview Summary (PTO 413)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 5) ☐ Notice of Informal Patent Application
- 3) ☒ Information Disclosure Statement(s) (PTO/SB-08)
- 6) ☐ Other: _____
- _____ Paper No(s)/Mail Date _____

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the claimed subject matter of **claims 10 & 26** must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. **Claims 10 & 26** are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for disclosing statistical processes, does not reasonably provide enablement for the "controller provides a verification having a statistically insignificant probability of falsehood, of at least one of the position and orientation of said moving platform, in the event that two or more sensors simultaneously provide erroneous outputs." The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make or use the invention commensurate in scope with these claims. Applicant's specification in paragraphs 44 – 49 describes how the system uses statistical methods to determine if two sensors would fail at the same time. They do not describe what applicant claims in claim 10 and hence one would not be able to figure out how to calculate or use, "statistically insignificant probability of falsehood."

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. **Claims 10 & 26** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Where applicant claims "controller provides a verification having a statistically insignificant probability of falsehood, of at least one of the position and orientation of said moving platform, in the event that two or more sensors simultaneously provide erroneous outputs." It is not clear as to what the meets

and bounds of the claims are as one would not be able to ascertain what is meant by "statistically insignificant probability of falsehood." Thus **claims 10 & 26** will not be examined on the merits as what is being claim is unclear and can not be ascertained from the specification either.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. **Claims 1, 15, 17 & 31** are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Shoham US PG Pub 20020038118 A1.

Regarding claims 1 & 17 where it is disclosed by Shoham to have both the apparatus and method of control a hybrid-parallel robot using position sensors. This is read upon by applicant's claim as indicated below:

"A robot comprising: a base member; a moving platform operative as the end effector of the robot [figure 2]; a plurality of adjustable links connecting said base member to said moving platform [figure 2], the status of each of said adjustable links being known by means of a sensor associated with each of said links [paragraph 24], the combined outputs of said sensors indicating the pose of said platform [paragraphs 24-28]; and a single additional sensor connected between said base member and said moving platform [paragraph 24]." However if applicant finds that it is not inherently

disclosed by Shoham to have an additional sensor, then the mere duplication of part by one of ordinary skill in the art is considered to be capable by one of ordinary skill in the art and hence it would have been obvious to have an additional sensor for redundancy purposes and also to increase accuracy of the device.

Regarding claims 15 & 31 where it is disclosed by Shoham to have a, "robot [which] is either of a parallel robot and a hybrid series-parallel robot." This is shown in figure 2.

Regarding claim 17 where it is disclosed by Shoham to have, "A method of using a robot, comprising the steps of: providing a robot comprising a base member [fig 2], a moving platform operative as the end effector of the robot [fig 2], and a plurality of adjustable links connecting said base member to said moving platform [fig 2], the status of each of said adjustable links being known by means of a sensor associated with each of said links [fig 2 & paragraph 24 - 28], and the combined outputs of said sensors indicating the pose of said platform; connecting a single additional sensor between said base member and said moving platform between predetermined points thereon [fig 2 & paragraph 24-28]; and using information from said sensor to provide verification for the positional reliability of said robot [Fig 2 and paragraph 24-28]."

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. **Claims 1 & 17** are rejected under 35 U.S.C. 102(e) as being anticipated by Zhu et al., US Patent 7040033 B2 (hereafter referenced as Zhu).

Regarding claims 1 & 17 where it is disclosed by Zhu to have, "A robot comprising: a base member [figs 2-4]; a moving platform operative as the end effector of the robot [figs 2-4]; a plurality of adjustable links connecting said base member to said moving platform [figs 2-4], the status of each of said adjustable links being known by means of a sensor associated with each of said links [figs 2-4], the combined outputs of said sensors indicating the pose of said platform [figs 2-4]; and a single additional sensor connected between said base member and said moving platform [figs 2-4]."

Zhu also discloses, "A method of using a robot, comprising the steps of: providing a robot comprising a base member [figs 2-4], a moving platform operative as the end effector of the robot [figs 2-4], and a plurality of adjustable links connecting said base member to said moving platform [figs 2-4], the status of each of said adjustable links being known by means of a sensor associated with each of said links [figs 2-4 & columns 3 & 4 lines 19 – 67 & 1 – 67 respectively], and the combined outputs of said sensors indicating the pose of said platform [figs 2-4 & columns 3 & 4 lines 19 – 67 & 1 – 67 respectively]; connecting a single additional sensor between said base member and said moving platform between predetermined points thereon [figs 2-4 & columns 3 & 4 lines 19 – 67 & 1 – 67 respectively]; and using information from said sensor to provide verification for the positional reliability of said robot [figs 2-4 & columns 3 & 4 lines 19 – 67 & 1 – 67 respectively]."

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. **Claims 2, 4, 6, 15, 19, 21 & 23** are rejected under 35 U.S.C. 103(a) as being unpatentable over Shoham in further view of Sheldon US Patent 5870834.

Regarding claims 2 & 19 where all the limitations of claim 1 & 17 respectively, are disclosed by Shoham who does not specifically disclose the limitation of, "at least one of said adjustable links is a linear extensible link and said sensor associated with said linear extensible link is a length sensor." This is disclosed by Sheldon in column 4 lines 1 – 40, thus it would have been obvious to one of ordinary skill in the art at the time of invention to modify Shoham by Sheldon to determine the accurate position of the robot and reduce errors from the position sensors.

Regarding claims 4 & 21 where all the limitations of claim 1 & 17 respectively, are disclosed by Shoham who does not specifically disclose the limitation of, "at least one of said adjustable links is an angular rotational hinge, and said sensor associated with said angular rotational hinge is an angular sensor." This is disclosed by Sheldon in column 4 lines 20 – 30.

Regarding claims 6 & 23, all the limitations of claims 1 & 17 respectively, are disclosed by Shoham who does not specifically disclose the further limitation of, "single

additional sensor is any one of a length sensor and an angular sensor." This is disclosed by Sheldon in column 4 lines 20 – 30.

11. **Claims 8, 9, 12-13, 18, 25 & 28-29** are rejected under 35 U.S.C. 103(a) as being unpatentable over Shoham and further in view of Zhu et al., US Patent 7040033 B2 (hereafter referenced as Zhu).

Regarding claims 8 & 18 where all the limitations of claims 1 & 17, respectively, are disclosed by Shoham who does not specifically disclose the further limitation of, "a controller which verifies at least one of the position and orientation of said moving platform as determined by the sensors associated with each of said plurality of links, by means of the output of said single additional sensor [columns 3 & 4 lines 19-67 & 1-40, respectively]." This is disclosed by Zhu as indicated in the above citation. Thus it would have been obvious to one of ordinary skill in the art at the time of invention to modify Shoham by Zhu to allow for precision measurements and accuracy need for robot movement between tool and workpiece.

Regarding claims 9 & 25 where all the limitations of claims 8 & 18 respectively, are disclosed by Shoham and Zhu and it is further disclosed by Zhu in columns 3 & 4 lines 19-67 & 1-40, respectively, to have, "said controller provides an absolute verification of at least one of the position and orientation of said moving platform in the event that any one sensor is providing an erroneous output." Thus it would have been obvious to one of ordinary skill in the art at the time of invention to modify Shoham by Zhu to allow for precision measurements and accuracy need for robot movement between tool and workpiece.

Regarding claims 12 -13 & 28-29 where all the limitations of claims 1 & 17 respectively, are disclosed by Shoham who does not specifically disclose having a 5th or 7th sensor and thus this is shown by Zhu where they have multiple sensor to compare with each other to determine the position of the robot. Thus Zhu discloses the invention except having an extra 7th sensor. It would have been obvious to one having ordinary skill in the art at the time of invention was made to have an additional sensor and thus would result in predictable results and would not require undue experimentation. Since it has been held that mere duplication of the essential working part of a device i.e., extra sensor on leg, involves only routine skill in the art. *St. Regis Paper Co. Vs Bemis Co.*, 193 USPQ 8; 549 F.2d 833 7th cir. 1977.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BHAVESH V. AMIN whose telephone number is (571)270-3255. The examiner can normally be reached on M - T, Friday off, 7:30am to 6:00pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Khoi Tran can be reached on 571-272-6919. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For

more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/BHAVESH V AMIN/
Examiner, Art Unit 3664
/KHOI TRAN/
Supervisory Patent Examiner, Art Unit 3664